PENGARUH PERUBAHAN KONSENTRASI LARUTAN NANOPARTIKEL PERAK TERHADAP TEGANGAN KELUARAN DAN KUAT ARUS PADA AKUMULATOR BASAH

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh penambahan nanopartikel perak ke dalam akumulator basah yang dilihat dari respon tegangan keluaran dan kuat arus. Konsentrasi nanopartikel perak yang ditambahkan diantaranya 1 mM, 2 mM, 3 mM, 4 mM, dan 5 mM.

Penelitian dimulai dengan sintesis nanopartikel perak dari larutan garam perak ($AgNO_3$) menjadi nanopartikel perak dengan menggunakan metode reduksi kimia. Reduktor yang berperan ialah $Na_3C_6H_5O_7$ (*trisodium citrate*) 1%. Setiap 2 mL larutan $AgNO_3$ ditambahkan lima tetes $Na_3C_6H_5O_7$ (*trisodium citrate*). Hasil sintesis kemudian diuji dengan metode efek Tyndall dan Spektrofotometri UV-Vis untuk memperoleh hasil secara kualitatif maupun kuantitif terbentuknya nanopartikel perak. Selanjutnya, setiap 2 mL nanopartikel perak konsentrasi tertentu ditambahkan kedalam 15 mL larutan H_2SO_4 akumulator basah. Tegangan keluaran dan kuat arus diukur selama lima jam dan akumulator tidak pernah di-*charge* selama penelitian.

Hasil penelitian menunjukkan tegangan keluaran dan kuat arus mengalami penurunan dengan adanya penambahan nanopartikel perak. Hal ini dikarenakan dengan adanya nanopartikel perak menyebabkan terhalangnya elektron bergerak dari anoda ke katoda. Waktu respon terbaik ditunjukkan oleh konsentrasi nanopartikel perak 1 mM.

Kata Kunci: akumulator basah, nanopartikel perak, tegangan keluaran, kuat arus

THE EFFECT OF CHANGES IN THE SILVER NANOPARTICLE SOLUTION CONCENTRATE TOWARDS THE OUTPUT VOLTAGE AND ELECTRIC CURRENT IN THE WET ACCUMULATOR

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ABSTRACT

The purpose of this research was to determine the effect of silver nanoparticles solution concentrate addition into the wet accumulator by observing the response of output voltage and electric current. The concentration of silver nanoparticles added were including 1 mM, 2 mM, 3 mM, 4 mM, and 5 mM.

This research began with the synthesis process of silver nanoparticles solution from the silver salt solution ($AgNO_3$) into silver nanoparticle by chemical reduction method. Reducing agents used is $Na_3C_6H_5O_7$ (*trisodium citrate*) 1%. Into each 2 mL of salt silver solution was added five drops of $Na_3C_6H_5O_7$ (*trisodium citrate*). The result then tested by Tyndall Effect method and UV-Vis spectrophotometry to obtain qualitative and quantitive results of the silver nanoparticles formation. Then, each 2 mL of a certain concentration silver nanoparticle added into 15 mL of H_2SO_4 in the wet accumulator. Output voltage and electric current measured for five hours and the accumulator never charged during research.

The result showed that the output voltage and electric current decreased with addition of silver nanoparticles solution. This was due to the presence of silver nanoparticles caused obstruction of the movement of electrons from the anode to the cathode. This is due to the presence of silver nanoparticles cause obstruction of the electrons move from the anode to the cathode. The best response time was indicated by a 1 mM concentration of silver nanoparticles.

Keywords: wet accumulator, silver nanoparticles, output voltage, electric current